Attorney Docket No: 509/35644
PATENT

JUL 27 2006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Michael J. HAWTHORNE et al.	Confirmation No.:	8826
Serial No.:	09/404,826	Art Unit:	2122
Filed:	September 24, 1999	Examiner:	Eric B. Kiss
For:	METHOD OF TRANSFERRING FILES AND ANALYSIS OF TRAIN OPERATIONAL DATA		

REPLY BRIEF

Mail Stop Appeal Brief - Patents
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23646
U.S. PATENT AND TRADEMARK OFFICE

Sir:

Below is a Reply Brief in response to the Examiner's Answer, mailed June 5, 2006, in the above-captioned matter.

Appellants respectfully submit that the Examiner's Answer, which gets bogged down in details of unsupportable assertions and conclusions, fails to satisfactorily rebut key points of Appellants' arguments challenging the claim rejections. Appellants respectfully offer the following to refocus on those key points.

I. Brief Recap of Claim 1

1. Regarding Appellants' invention, the "at issue" paragraphs of Applicants' Claim 1 are:

> a. 2nd Paragraph - determining from the [on-board] data base the location of the train relative to the track structure and whether the train is within communication range of one of the remote base stations, the determining being made by using location information about the train, information about the track structure and location information about the multiple remote base stations from the data base stored on the computer on-board the train;

b 3rd Paragraph - establishing from on-board the train a wireless communication with one of the multiple remote base stations determined to be within communication range;

2. That is, the data base is in the computer on-board the train. From that data base, the location of the train is determined. It is further determined, from that data base on-board the train, whether the train is in communication range of a remote base station. If a remote base station is determined to be within communication range, a wireless communication is established from on-board the train. The invention is quite clear.

II. Brief Recap of References

1. Neeson et al. is directed to an apparatus and method for tracking, reporting and recording equipment inventory on a locomotive. A Health Report reflecting equipment identification information is compiled and stored in an on-board processing device (computer). The on-board processing device is configured to both transmit equipment inventory information and to receive communications from at least one remote base communication unit (see Neeson et al. column 3, lines 61-66). The application of the invention of Neeson et al. is known as "ALERTS" and is designed to "piggyback" on the already existing ABNS (AMCI Base Networking System) and ATCS (Advanced Train Contact System) systems on locomotives (see Neeson et al. column 22, lines 55-60). In ABNS, communications with locomotives is initiated through the base stations, which are in contact with mobile communication packages (MCP) on-board the locomotives (see Neeson et al. column 2, lines 5-8) (emphasis provided). It cannot be more clear that a) the "ALERTS" system of Neeson et al. piggybacks on ABNS and b) in ABNS, communication with locomotives is initiated through the base stations. Neeson et al. discloses no capability, reason or need to determine from a data base on-board the train whether a wayside station is within communication range.

2. Heggestad et al. is directed to a train control system employing a series of wayside control units spaced along the track to control trains in a local area. Each wayside unit has a data base in memory that includes operational profile data of the local area and which data are communicated to a train's computer. The train's computer in turn determines the proper train control instructions based upon the received data (see Heggestad et al., Abstract and column 4, line 56 to column 6, line 35). The wayside units communicate data to the train and the train reacts based upon the received data. The on-board commuter is provided with location information. Heggestad et al. does not disclose that any determination is made, from a data base on-board, of the train's location or the location of a remote station.

3. Kull is directed to a rail vision system on a train comprising a signal locating system and rail navigation system. The signal location system isolates visually an upcoming wayside signal device. The rail navigation system determines the position of the train on the track and tells the signal locating system the location of the wayside signal device relative to the train. An on-board computer of the rail navigation system receives information from the signal location system. The on-board computer has a data base with train and track information. The received information is compared to information stored in the on-board computer. The rail navigation system then warns the train operator of restrictive signals and imposes braking of the train if the operator fails to acknowledge the warning (see Kull, Abstract and column 7, line 50 to column 8, line 53). The data base in Kull wants to know and verify the position of the train on the track and can also determine visually where the next wayside station is. However, there is no disclosure in Kull about any wireless communication with remote stations.

III. Brief Recap of Appellants' Key Points

1. The first point is that the applied §103(a) references (Neeson et al., Heggestad et al. and Kull) against Appellants' independent Claim 1 do not provide, and the Examiner has not specifically identified, any concrete suggestion or teaching to serve as a valid

motivation to string together these three disparate references to modify the Equipment Health Reporting System of Neeson et al. to achieve Appellants' invention as stated in Claim 1.

2. Second, the fact is that Neeson et al. does not disclose the elements of the second and third Paragraphs of Applicants' Claim 1, as alleged by the Examiner. For example, on page 1 of the Office Action (see Final Rejection (November 1, 2005)), the Examiner states "As per Claim 1, Neeson et al. discloses...[a] determining on-board if a remote station is within communication range (see column 5, lines 16-32; and column 7, line 63 through column 8, line 3); and [b] initiating from on-board wireless communication between an on-board computer (fold unit) and a remote base station (base station) (see column 7, lines 29-47)..." Neither of the assertions are substantiated by the referenced disclosures in Neeson et al. as rebutted on pages 4-11 of Appellants' Appeal Brief. Moreover, the Examiner specifically states in the Office Action (see Final Rejection (November 1, 2005) at page 3) "Neeson et al. fails to explicitly disclose determining [Note: the Examiner conveniently omitted the phrase "from the data base" as part of Nesson's failure] on-board the location of the train and the location of the next remote station using location information about the train and the remote stations stored on the computer on-board the train". Thus, it seems clear that Neeson et al. does not include the elements of Claim 1 alleged by the Examiner and does not meet the test of a valid base reference for this obviousness rejection of Appellants' Claim 1 (see Section II herein regarding the disclosure in Neeson et al.).

3. Third, the Examiner then attempts to rely on Heggestad et al. to remedy some of the acknowledged failures of Nesson et al. as a reference. However, Heggestad et al. also does not disclose the elements of the second and third Paragraphs of Appellants' Claim 1, as alleged by the Examiner, particularly the use of Heggestad et al. to remedy the failure of Neeson et al.'s disclosure noted in 2. above [see Appellants' Appeal Brief at pages 6-7]. Thus, it appears that Heggestad et al. does not meet the test of a valid supporting reference for this obviousness

rejection of Appellants' Claim 1, even if, arguendo, Neeson et al. were a valid base reference (see Section II herein regarding the disclosure in Heggestad et al.).

4. Fourth, the Examiner finally acknowledges in the Office Action (see Final Rejection (November 1, 2005) at page 4) that "Neeson et al. further fails to expressly disclose the computer [on-board] having a data base including track structure information and location information about multiple remote base stations and the determining [of] the location of the train using the data base information". Then, the Examiner casually asserts that "However, Kull teaches such a data base and its use in determining location relative to track structures and remote base stations (see for example col. 8, lines 27-35)". (See Office Action November 1, 2005 at pages 4-5). While Kull discloses a data base, there is no disclosure, teaching or suggestion in Kull about any communication (wireless or otherwise) between the train and a remote base station (see Section II herein about the disclosure in Kull). Thus, it appears that Kull does not meet the test of a valid supporting reference for this obviousness rejection of Appellants' Claim 1, even if, arguendo, Neeson et al. were a valid base reference.

5. Appellants respectfully further assert that just because Kull includes a data base with train and track information, that is not, by itself, a motivation to modify Neeson et al. The disclosure in Neeson et al. does not discuss or cry out to be modified to change its data base or method of operation. Moreover, the Equipment Health Reporting System of Neeson et al. would have to be completely redesigned to alter its computer's software data base (designed to generate an equipment report and to respond to queries from base stations) to take on the rail vision (not wireless communication) system of Kull - not to mention taking on the function of the wayside station train control system of Heggestad et al. As stated in *In re Dow Chemical Co.*, 837 F.2d 469, 473, "There must be a reason or suggestion in the art for selecting the procedure used, other than the knowledge learned from the applicant's disclosure. *Interconnect Planning Corporation v. Feil*, 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir. 1985)."

IV. Brief Rebuttal of Selected Examiner Statements/Assertions in Examiner's Response

1. The Examiner states that "Appellant suggests...that the ground network must initiate communication." (See Examiner's Answer at page 5). Appellants simply asserted that there is no disclosure in Neeson et al. that reads on the method step of the second paragraph of Appellants' Claim 1.

2. The Examiner states that "Kull provides the capability to determine whether a locomotive is within communication range (e.g. visual communication)..." (see Examiner's Answer at page 8)..."Appellants assert that having a capability to "visually" see a wayside signal device is not the "wireless communication" of Appellants' Claim 1. Moreover, regardless of whether or not "visually" seeing a wayside signal device is a communication, it is well settled that simply having a "capability" in one reference does not provide a motivation upon which to modify another reference. There must be a suggestion or motivation to do so. As stated in *In re Mills*, 16 USPQ2d 1430, 1432 (Fed. Cir. 1990), [W]hile Mathis' apparatus may be **capable** of being modified to run the way Mills' apparatus is claimed, there must be a suggestion or **motivation** in the **reference** to do so". Also *see In re Gordon,* 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984), where it is stated that "[T]he mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification."

3. The Examiner states that "Appellants' claims do not require initiating communication" (see Examiner's Answer at page 9). Appellants assert that the examiner is dancing on the head of a pin. While Appellants did back away from a previous amendment to change the word "establishing" to "initiating", this was done in the interests of moving the case along to satisfy what we believed to be the examiner's differentiation between the words "establish" and "initiate" (yes, the word "initiate" was not in the Specification). However, Merriam Webster's Collegiate Dictionary (Tenth Edition) defines "establish", *inter alia,* as "to

institute", "to introduce", "to bring into existence", "to bring about", and defines "initiate", *inter alia*, as "to cause or facilitate the beginning of", "get going" (see pages 396 and 600 attached). The bottom line is that a reasonable person skilled in the train art would know that "establishing communication" and "initiating communication" are the same.

4. The Examiner states, referring to Nesson et al., that "passing off" infers that as a new base station comes within range, radio communication is handled by the new base station that is determined to be within range. See Neeson et al., at col. 7, lines 33-49. The Examiner goes on to state, "Executing that handoff requires that the locomotive computer establish on-board wireless communication with the new base station in order to remain in contact. See Id." (emphasis added) (see Examiner's Answer at page 10). Appellants assert that the Examiner is confusing the act of a handoff from one base station to another with the on-board locomotive computer establishing communication with a remote base station determined by the on-board data base in the computer to be within communication range, as claimed in Appellants' Claim 1. Neeson et al. discloses nothing to support the Examiner's conclusion of any requirement that the locomotive establish any wireless communication.

5. The Examiner states that "Neeson et al. at col. 2, lines 5-7, merely states that communication is **initiated through** the base station, and not **initiated by** the base stations". (See Examiner's Answer at page 11). The Examiner has apparently failed to understand that the apparatus of Neeson et al. includes a processing device operative to broadcast a Query for Health Report to on-board intelligent devices and receive Health Report messages from on-board intelligent devices..." (See Neeson et al. at col. 4, lines 1-4). Appellants assert that whether the communication is initiated "through" or "by" the base station, it is not initiated by the train, since the Query is broadcast to the on-board intelligent devices which receive and respond to the Query.

6. The Examiner states that "In particular, the examiner maintained (and still maintains) that the two-frequency communication system of Neeson et al. requires (here's that word again - emphasis added) the locomotive to initiate (emphasis added - is the examiner interchangably using "initiate" and "establish"?) all communication at [a] frequency used for outgoing messages because the remote base stations do not transmit at that frequency and, therefore, cannot initiate (emphasis added) such communication" (see Examiner's Answer page 12). Appellants assert that the examiner misses the point. Responding to a Query for a Health Report that arrived on one frequency (thereby having communication established or initiated by the base station making the Query) and responding to the Query on another frequency is not "establishing communication" and thus does not meet Appellants' Claim 1 language of "determining from the data base [on-board]...whether the train is within communication range of one of the remote base stations...and establishing from on-board the train a wireless communication with one of the multiple base stations determined to be within communication range".

V. Summary

Appellants respectfully assert that the Examiner's Answer has failed to change the fact that the disclosure in Neeson et al. is not sufficient to serve as a valid base reference for the §103(a) obviousness rejection. Moreover, neither Neeson et al., nor Heggestad et al. nor Kull, individually or collectively, provide a suggestion, teaching or motivation to combine these references to modify Neeson et al. to achieve Appellants' claimed invention. In effect, the Examiner has attempted to use pure hindsight reconstruction to piggyback on Appellants' disclosure as a way to modify Neeson et al. Absent a teaching, suggestion or motivation, the obviousness rejection of Appellants' claims should be reversed and the application should be allowed.

Conclusion

All of the arguments in the Final Office Action and the Examiner's Answer are overcome by the arguments in Appellant's Brief or this Reply Brief.

It is respectfully requested that, if necessary to effect a timely response, this paper be considered as a Petition for an Extension of Time sufficient to effect a timely response and shortages in other fees, be charged, or any overpayment in fees be credited, to the Account of Barnes & Thornburg LLP, Deposit Account No. 02-1010 (509/35644).

Respectfully submitted,

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es·prit de corps \is-ˌprē-də-ˈkȯr\ *n* [F] (1780) : the common spirit existing in the members of a group and inspiring enthusiasm, devotion, and strong regard for the honor of the group

es·py \is-ˈpī\ *vt* **es·pied; es·py·ing** [ME *espien*, fr. OF *espier* — more at SPY] (14c) : to catch sight of ⟨among the several horses . . . she *espied* the white mustang —Zane Grey⟩

-esque \ˈesk\ *adj suffix* [F, fr. It *-esco*, of Gmc origin; akin to OHG *-isc* -ish — more at -ISH] : in the manner or style of : like ⟨*statuesque*⟩

Es·qui·maux \ˈes-kə-ˌmō\ *n, pl* **Esquimaux** *or* **Es·qui·maux** \-ˌmō(z)\ [F, fr. Montagnais (Algonquian language)] (1744) : ESKIMO

es·quire \ˈes-ˌkwīr, is-ˈ\ *n* [ME, fr. MF *escuier* squire, fr. LL *scutarius*, fr. L *scutum* shield; akin to Olr *sciath* shield] (15c) **1** : a member of the English gentry ranking below a knight **2** : a candidate for knighthood serving as shield bearer and attendant to a knight **3** — used as a title of courtesy usu. placed in its abbreviated form after the surname ⟨John R. Smith, *Esq.*⟩ **4** *archaic* : a landed proprietor

ess \ˈes\ *n* (1540) **1** : the letter *s* **2** : something resembling the letter *S* in shape; *esp* : an S-shaped curve in a road

-ess \əs, is *also* ˌes\ *n suffix* [ME *-esse*, fr. OF, fr. LL *-issa*, fr. Gk] : female ⟨*giantess*⟩

¹es·say \e-ˈsā, a-ˈsā, ˈe-ˌsā\ *vt* (14c) **1** : to put to a test **2** : to make an often tentative or experimental effort to perform : TRY *syn* see ATTEMPT — **es·say·er** *n*

²es·say \ˈe-ˌsā; *senses 1, 2 & 4 also* e-ˈsā\ *n* [ME, fr. MF *essai*, ultim. fr. LL *exagium* act of weighing, fr. *ex-* + *agere* to drive — more at AGENT] (14c) **1** : TRIAL, TEST **2 a** : EFFORT, ATTEMPT; *esp* : an initial tentative effort **b** : the result or product of an attempt **3 a** : an analytic or interpretative literary composition usu. dealing with its subject from a limited or personal point of view **b** : something resembling such a composition ⟨a photographic ～⟩ **4** : a proof of an unaccepted design for a stamp or piece of paper money

es·say·ist \ˈe-ˌsā-ist\ *n* (1601) : a writer of essays

es·say·is·tic \ˌe-(ˌ)sā-ˈis-tik\ *adj* (1862) **1** : of or relating to an essay or an essayist **2** : resembling an essay in quality or character

essay question *n* (1947) : an examination question that requires an answer in a sentence, paragraph, or short composition

es·sence \ˈe-sᵊn(t)s\ *n* [ME, fr. MF & L; MF, fr. L *essentia*, fr. *esse* to be — more at IS] (14c) **1 a** : the permanent as contrasted with the accidental element of being **b** : the individual, real, or ultimate nature of a thing esp. as opposed to its existence **c** : the properties or attributes by means of which something can be placed in its proper class or identified as being what it is **2** : something that exists : ENTITY **3 a** (1) : a volatile substance or constituent (as of perfume) (2) : a constituent or derivative possessing the special qualities (as of a plant or drug) in concentrated form; *also* : a preparation of such an essence or a synthetic substitute **b** : ODOR, PERFUME **4** : one that possesses or exhibits a quality in abundance as if in concentrated form ⟨she was the ～ of punctuality⟩ — **in essence** : in or by its very nature : ESSENTIALLY, BASICALLY ⟨was *in essence* an honest person⟩ — **of the essence** : of the utmost importance ⟨time is *of the essence*⟩

Es·se·ne \ˈi-ˌsēn, ˈe-ˌsēn\ *n* [Gk *Essēnoi*] (1553) : a member of a monastic brotherhood of Jews in Palestine from the 2d century B.C. to the 2d century A.D. — **Es·se·ni·an** \i-ˈsē-nē-ən, e-ˈse-\ *or* **Es·se·nic** \-ˈse-nik, -ˈsē-nik\ *adj* — **Es·se·nism** \-ˈsē-ˌni-zəm\ *n*

¹es·sen·tial \i-ˈsen(t)-shəl\ *adj* (14c) **1** : of, relating to, or constituting essence : INHERENT **2** : of the utmost importance : BASIC, INDISPENSABLE, NECESSARY ⟨～ foods⟩ ⟨an ～ requirement for admission to college⟩ **3** : IDIOPATHIC ⟨～ disease⟩ ⟨～ hypertension⟩ — **es·sen·tial·ly** \-ˈsench-lē, -ˈsen-chə-\ *adv* — **es·sen·tial·ness** \-ˈsen-chəl-nəs\ *n*

syn ESSENTIAL, FUNDAMENTAL, VITAL, CARDINAL mean so important as to be indispensable. ESSENTIAL implies belonging to the very nature of a thing and therefore being incapable of removal without destroying the thing itself or its character ⟨conflict is *essential* in drama⟩. FUNDAMENTAL applies to something that is a foundation without which an entire system or complex whole would collapse ⟨*fundamental* principles of algebra⟩. VITAL suggests something that is necessary to a thing's continued existence or operation ⟨cut off from *vital* supplies⟩. CARDINAL suggests something on which an outcome turns or depends ⟨a *cardinal* rule in buying a home⟩.

²essential *n* (15c) **1** : something basic ⟨the ～s of astronomy⟩ **2** : something necessary, indispensable, or unavoidable

essential amino acid *n* (1935) : an amino acid (as lysine) required for normal health and growth, manufactured in the body in insufficient quantities or not at all, and usu. supplied by dietary protein

es·sen·tial·ism \-ˌli-zəm\ *n* (1927) **1** : an educational theory that ideas and skills basic to a culture should be taught to all alike by time-tested methods — compare PROGRESSIVISM **2** : a philosophical theory ascribing ultimate reality to essence embodied in a thing perceptible to the senses — compare NOMINALISM — **es·sen·tial·ist** \-list\ *adj or n*

es·sen·ti·al·i·ty \i-ˌsen(t)-shē-ˈa-lə-tē\ *n, pl* **-ties** (1616) **1 a** : essential nature : ESSENCE **b** : an essential quality, property, or aspect **2** : the quality or state of being essential ⟨the ～ of freedom and justice —P. G. Hoffman⟩

es·sen·tial·ize \i-ˈsen(t)-shə-ˌlīz\ *vt* **-ized; -iz·ing** (1913) : to express or formulate in essential form : reduce to essentials

essential oil *n* (1674) : any of a class of volatile oils that give plants their characteristic odors and are used esp. in perfumes and flavorings — compare FIXED OIL

es·soin \i-ˈsȯin\ *n* [ME *essoine*, fr. MF, fr. OF, fr. *essoinier* to offer an essoin, fr. *es-* ex- + *soine* legal excuse, of Gmc origin; akin to OS *sunnea* denial, OE *sōth* truth — more at SOOTH] (14c) **1** : an excuse for not appearing in an English law court at the appointed time **2** *obs* : EXCUSE, DELAY

es·so·nite \ˈe-sᵊn-ˌīt\ *n* [F, fr. Gk *hēsson* inferior; fr. its being less hard than true hyacinth] (1820) : a yellow to brown garnet

¹-est \əst, ist\ *adj suffix or adv suffix* [ME, fr. OE *-st, -est, -ost*; akin to OHG *-isto* (adj. superl. suffix), Gk *-istos*] — used to form the superlative degree of adjectives and adverbs of one syllable (*fattest*) (*latest*)

es·tab·lish \is-ˈta-blish\ *vt* [ME *establisen*, fr. MF *establiss-*, stem of *establir*, fr. L *stabilire*, fr. *stabilis* stable] (14c) **1** : to institute permanently by enactment or agreement **2** *obs* : SETTLE, make firm or stable **b** : to introduce and cause to grow ⟨～ grass on pasturelands⟩ **4 a** : to bring into existence ⟨～*ed* a republic⟩ **b** : BRING ABOUT, EFFECT ⟨～*ed* friendly relations⟩ **5 a** : to put on a firm basis : SET UP ⟨～ his son in business⟩ **b** : to put into a favorable position **c** : to gain full recognition or a ⟨the role ～*ed* her as a star⟩ **6** : to make (a church) a national institution **7** : to put beyond doubt : PROVE ⟨～*ed* my innocence⟩ — **es·tab·lish·a·ble** \-shə-bəl\ *adj* — **es·tab·lish·er** \-shər\ *n*

established church *n* (1731) : a church recognized by law as the church of a nation or state and supported by civil authority

es·tab·lish·ment \is-ˈta-blish-mənt\ *n* (15c) **1** : something established **a** : a settled arrangement; *esp* : a code of laws **b** : CHURCH **c** : a permanent civil or military organization **d** : business or residence with its furnishings and staff **e** : a private institution **2** : an established order of society: as **a** : a group of social, economic, and political leaders who form (as of a nation) **b** *often cap* : a controlling group ⟨the literary *Establishment*⟩ **3** : the act of establishing **b** : the state of being established

es·tab·lish·men·tar·i·an \is-ˌta-blish-mən-ˈter-ē-ən, -ˌmen-\ *n* : of, relating to, or favoring the social or political establishment — **establishmentarian** *n* — **es·tab·lish·men·tar·i·an·ism** \-ē-ə-ni-ˌmi-zəm\

es·ta·mi·net \e-stä-mē-nā\ *n, pl* **-nets** \-nā(z)\ [F] (1814) : a small cafe

es·tate \is-ˈtāt\ *n* [ME *estat*, fr. OF — more at STATE] (13c) **1** : CONDITION **2** : social standing or rank esp. of a high order **3** : social or political class; *specif* : one of the great classes (as the clergy, and the commons) formerly vested with distinct powers **4 a** : the degree, quality, nature, and extent of one's land or other property **b** (1) : POSSESSIONS, PROPERTY ⟨*son's* property in land and tenements ⟨a man of small ～⟩ ⟨assets and liabilities left by a person at death **c** : a landed ⟨with a large house on it **d** *Brit* : PROJECT **4** **5** *Brit* : STATE

estate agent *n* (1880) *Brit* : a real estate broker or manager

estate car *n* (1950) *Brit* : STATION WAGON

estate tax *n* (1928) : an excise in the form of a percentage tax that is levied on the privilege of an owner of property transferring the property to others after his or her death — compare INHERITANCE TAX 1

¹es·teem \is-ˈtēm\ *n* (14c) **1** *archaic* : WORTH, VALUE **2** *archaic* : OPINION, JUDGMENT **3** : the regard in which one is held; *esp* : ESTEEM ⟨the ～ we all feel for her⟩

²esteem *vt* [ME *esteemen* to estimate, fr. MF *estimer*, fr. L *aestimare*] (15c) **1** *archaic* : APPRAISE **2 a** : to view as : CONSIDER ⟨I ～ it a privilege⟩ **b** : THINK, BELIEVE **3** : to set a high value on : REGARD and prize accordingly *syn* see REGARD

es·ter \ˈes-tər\ *n* [G, fr. *Essigäther* ethyl acetate, fr. *Essig* vinegar + *Äther* ether] (ca. 1852) : any of a class of often fragrant compounds represented by the formula RCOOR′ and that are usu. the reaction between an acid and an alcohol with elimination of water

es·ter·ase \ˈes-tə-ˌrās, -ˌrāz\ *n* (1910) : an enzyme that accelerates hydrolysis or synthesis of esters

es·ter·i·fy \e-ˈster-ə-ˌfī\ *vt* **-fied; -fy·ing** (ca. 1905) : to convert into an ester — **es·ter·i·fi·ca·tion** \-ˌster-ə-(ə-)fə-ˈkā-shən\ *n*

Es·ther \ˈes-tər\ *n* [L, fr. Heb *Estēr*] **1** : the Jewish heroine of the Old Testament book of Esther **2** : a narrative book of canonical and Christian Scripture — see BIBLE table

es·thete, es·thet·ic, es·the·ti·cian, es·the·ti·cism *var of* AESTHETIC, AESTHETICIAN, AESTHETICISM

es·ti·ma·ble \ˈes-tə-mə-bəl\ *adj* (15c) **1** : capable of being estimated *archaic* : VALUABLE **3** : worthy of esteem — **es·ti·ma·bly** \-blē\ *adv*

¹es·ti·mate \ˈes-tə-ˌmāt\ *vt* **-mat·ed; -mat·ing** [L *aestimatus*, pp. of *aestimare* to value, estimate] (ca. 1532) **1** *archaic* : ESTIMATE **2 a** : to judge tentatively or approximately the value, significance of **b** : to determine roughly the size, extent, **c** : to produce a statement of the approximate cost of **3** : CONCLUDE — **es·ti·ma·tive** \-ˌmā-tiv\ *adj*

syn ESTIMATE, APPRAISE, EVALUATE, VALUE, RATE, ASSESS judge something with respect to its worth or significance; implies a judgment, considered or casual, that precedes action in place of actual measuring or counting or testing out ⟨estimate a crowd at two hundred⟩. APPRAISE commonly implies the expert of the monetary worth of a thing, but it may be critical judgment ⟨having their house *appraised*⟩. EVALUATE an attempt to determine relative or intrinsic worth in terms monetary ⟨*evaluate* a student's work⟩. VALUE equals APPRAISE without implying expertness of judgment ⟨a watercolor donated at $500⟩. RATE adds to ESTIMATE the notion of placing according to a scale of values ⟨a highly *rated* restaurant⟩. implies a critical appraisal [or the purpose of understanding, or as a guide in taking action ⟨officials are trying to damage⟩.

²es·ti·mate \ˈes-tə-mət\ *n* (1563) **1** : the act of appraising : CALCULATION **2** : an opinion or judgment of the nature or quality of a person or thing ⟨had a high ～ of his ability⟩ rough or approximate calculation **b** : a numerical value from a statistical sample and assigned to a population parameter statement of the cost of work to be done

es·ti·ma·tion \ˌes-tə-ˈmā-shən\ *n* (14c) **1** : JUDGMENT, OPINION : the act of estimating something **b** : the value, amount, or at in an estimate **3** : ESTEEM, HONOR

es·ti·ma·tor \ˈes-tə-ˌmā-tər\ *n* (1611) **1** : one that estimates MATH 3b; *also* : a statistical function whose value for a sample an estimate of a population parameter

es·ti·val \ˈes-tə-vəl\ *adj* [ME, fr. MF or L; MF, fr. L *aestivalis*, of summer, fr. *aestas* summer — more at YEAR] (14c) : of

es·ti·vate \ˈes-tə-ˌvāt\ *vi* **-vat·ed; -vat·ing** [L *aestivatus*, pp. of *aestivare* to spend the summer, fr. *aestas*] (1826) : to pass the summer esp. in a state of torpor

in·growth \'in-ˌgrōth\ *n* (1870) **1** : a growing inward (as to fill a void) **2** : something that grows in or into a space

in·gui·nal \'iŋ-gwə-nᵊl\ *adj* [ME *inguynale*, fr. L *inguinalis*, fr. *inguin-*, *inguen* groin — more at ADEN-] (15c) : of, relating to, or situated in the region of the groin or in either of the lowest lateral regions of the abdomen ⟨~ hernia⟩

in·gur·gi·tate \in-'gər-jə-ˌtāt\ *vt* **-tat·ed; -tat·ing** [L *ingurgitatus*, pp. of *ingurgitare*, fr. *in-* + *gurgit-*, *gurges* whirlpool — more at VORACIOUS] (ca. 1570) : to swallow greedily or in large quantities : GUZZLE — **in·gur·gi·ta·tion** \(ˌ)in-ˌgər-jə-'tā-shən\ *n*

in·hab·it \in-'ha-bət\ *vb* [ME *enhabiten*, fr. MF & L; MF *enhabiter*, fr. L *inhabitare*, fr. *in-* + *habitare* to dwell, freq. of *habēre* to have — more at GIVE] *vt* (14c) **1** : to occupy as a place of settled residence or habitat : live in ⟨~ a small house⟩ **2** : to be present in or occupy in any manner or form ⟨the human beings who ~ this tale —Al Newman⟩ ~ *vi*, *archaic* : to have residence in a place : DWELL — **in·hab·it·able** \-bə-tə-bəl\ *adj* — **in·hab·it·er** *n*

in·hab·i·tan·cy \in-'ha-bə-tən(t)-sē\ *n* (1681) : INHABITATION

in·hab·i·tant \in-'ha-bə-tənt\ *n* (15c) : one that occupies a particular place regularly, routinely, or for a period of time ⟨~s of large cities⟩ ⟨the tapeworm is an ~ of the intestine⟩

in·hab·i·ta·tion \in-ˌha-bə-'tā-shən\ *n* (15c) : the act of inhabiting : the state of being inhabited

inhabited *adj* (15c) : having inhabitants

in·hal·ant \in-'hā-lənt\ *n* (ca. 1834) : something (as an allergen or medication) that is inhaled — **inhalant** *adj*

in·ha·la·tion \ˌin-hə-'lā-shən, ˌi-nᵊl-'ā-\ *n* (ca. 1623) **1** : the act or an instance of inhaling **2** : material (as medication) to be taken in by inhaling — **in·ha·la·tion·al** \-shnəl, -shə-nᵊl\ *adj*

in·ha·la·tor \'in-hə-ˌlā-tər, 'i-nᵊl-ˌā-\ *n* (1925) : a device providing a mixture of oxygen and carbon dioxide for breathing that is used esp. in conjunction with artificial respiration

in·hale \in-'hā(ə)l\ *vb* **in·haled; in·hal·ing** [*in-* + *exhale*] *vt* (1725) **1** : to draw in by breathing **2** : to take in eagerly or greedily ⟨*inhaled* about four meals at once —Ring Lardner⟩ ~ *vi* : to breathe in — **in·hale** \in-', -'in-ˌ\ *n*

in·hal·er \in-'hā-lər\ *n* (1778) **1** : a device by means of which medicinal material is inhaled **2** : one that inhales

in·har·mon·ic \ˌin-(ˌ)här-'mä-nik\ *adj* (ca. 1828) : not harmonic

in·har·mo·ni·ous \-'mō-nē-əs\ *adj* (1711) **1** : not harmonious : DISCORDANT **2** : not fitting or congenial : CONFLICTING — **in·har·mo·ni·ous·ly** *adv* — **in·har·mo·ni·ous·ness** *n*

in·har·mo·ny \(ˌ)in-'här-mə-nē\ *n* (1799) : DISCORD

in·here \in-'hir\ *vi* **in·hered; in·her·ing** [L *inhaerēre*, fr. *in-* + *haerēre* to adhere] (15c) : to be inherent

in·her·ence \in-'hir-ən(t)s, -'her-\ *n* (1577) : the quality, state, or fact of inhering

in·her·ent \-ənt\ *adj* [L *inhaerent-*, *inhaerens*, prp. of *inhaerēre*] (1581) : involved in the constitution or essential character of something : belonging by nature or habit : INTRINSIC — **in·her·ent·ly** *adv*

in·her·it \in-'her-ət\ *vb* [ME *enheriten* to make one an heir, inherit, fr. MF *enheriter* to make one an heir, fr. LL *inhereditare*, fr. L *in-* + *hereditas* inheritance — more at HEREDITY] *vt* (14c) **1** : to come into possession of or receive esp. as a right or divine portion ⟨and every one who has left houses or brothers or sisters . . . for my name's sake, will receive a hundredfold, and ~ eternal life —Mt 19:29 (RSV)⟩ **2 a** : to receive from an ancestor as a right or title descendible by law at the ancestor's death **b** : to receive as a devise or legacy **3** : to receive from ancestors by genetic transmission ⟨~ a strong constitution⟩ **4** : to have in turn or receive as if from an ancestor ⟨~*ed* the problem from his predecessor⟩ ~ *vi* : to take or hold a possession or rights by inheritance — **in·her·i·tor** \-ə-tər\ *n* — **in·her·i·tress** \-ə-trəs\ *or* **in·her·i·trix** \-ə-(ˌ)triks\ *n*

in·her·it·able \in-'her-ə-tə-bəl\ *adj* (15c) **1** : capable of being inherited : TRANSMISSIBLE **2** : capable of taking by inheritance — **in·her·it·abil·i·ty** \-ˌher-ə-tə-'bi-lə-tē\ *n* — **in·her·it·able·ness** \-'her-ə-tə-bəl-nəs\ *n*

in·her·i·tance \in-'her-ə-tən(t)s\ *n* (14c) **1 a** : the act of inheriting property **b** : the reception of genetic qualities by transmission from parent to offspring **c** : the acquisition of a possession, condition, or trait from past generations **2** : something that is or may be inherited **3 a** : TRADITION **b** : a valuable possession that is a common heritage from nature **4** *obs* : POSSESSION

inheritance tax *n* (1841) **1** : an excise in the form of a percentage of the value of the property received that is levied on the privilege of an heir to inherit property **2** : DEATH TAX; *esp* : ESTATE TAX

in·hib·in \in-'hi-bən\ *n* [L *inhibēre* to inhibit + E [1]*-in*] (1932) : a human hormone that is secreted by Sertoli cells in the male and granulosa cells in the female and that inhibits the secretion of follicle-stimulating hormone

in·hib·it \in-'hi-bət\ *vb* [ME, fr. L *inhibitus*, pp. of *inhibēre*, fr. *in-* [2]in- + *habēre* to have — more at HABIT] *vt* (15c) **1** : to prohibit from doing something **2 a** : to hold in check : RESTRAIN **b** : to discourage from free or spontaneous activity esp. through the operation of inner psychological impediments or of social controls ~ *vi* : to cause inhibition *syn* see FORBID — **in·hib·i·tive** \-bə-tiv\ *adj* — **in·hib·i·to·ry** \-bə-ˌtōr-ē, -ˌtȯr-\ *adj*

in·hi·bi·tion \ˌin-hə-'bi-shən, ˌi-nə-\ *n* (14c) **1 a** : the act of inhibiting : the state of being inhibited **b** : something that forbids, debars, or restricts **2** : an inner impediment to free activity, expression, or functioning: as **a** : a psychic activity imposing restraint upon another activity **b** : a restraining of the function of a bodily organ or an agent (as an enzyme)

in·hib·i·tor \in-'hi-bə-tər\ *n* (ca. 1611) : one that inhibits; *esp* : an agent that slows or interferes with a chemical action

in·hold·ing \'in-ˌhōl-diŋ\ *n* (1947) : privately owned land inside the boundary of a national park

in·ho·mo·ge·ne·i·ty \(ˌ)in-ˌhō-mə-jə-'nē-ə-tē, -'nā- *also* -'nī-; *esp Brit* -ˌhä-mə-\ *n, pl* **-ties** (1899) **1** : the condition of not being homogeneous

shelter or sustenance — **in·hos·pi·ta·ble·ness** *n* — **in·ho** \-blē\ *adv*

in·hos·pi·tal·i·ty \(ˌ)in-ˌhäs-pə-'ta-lə-tē\ *n* (ca. 1576) : the state of being inhospitable

in–house \'in-ˌhau̇s, -'hau̇s\ *adj* (ca. 1956) : existing, originat ried on within a group or organization or its facilities : not o ~ publication⟩ ⟨a company's ~ staff⟩ — **in–house** *adv*

in·hu·man \(ˌ)in-'hyü-mən, -'yü-\ *adj* [ME *inhumayne*, fr. MF *inhumain*, fr. L *inhumanus*, fr. *in-* + *humanus* human] (15c) ing pity, kindness, or mercy : SAVAGE ⟨an ~ tyrant⟩ **b** : co SONAL ⟨his usual quiet, almost ~ courtesy —P. Tennyson : not worthy of or conforming to the needs of human beings conditions⟩ **2** : of or suggesting a nonhuman class of beings man·ly *adv* — **in·hu·man·ness** \-mən-nəs\ *n*

in·hu·mane \ˌin-(ˌ)hyü-'mān, -(ˌ)yü-\ *adj* [MF *inhumain* & *manus*] (1599) : not humane : INHUMAN 1 — **in·hu·mane·ly**

in·hu·man·i·ty \-'ma-nə-tē\ *n, pl* **-ties** (15c) **1 a** : the quality being cruel or barbarous **b** : a cruel or barbarous act **2** : warmth or geniality : IMPERSONALITY

in·hume \in-'hyüm\ *vt* **in·humed; in·hum·ing** [prob. fr. F *in* ML *inhumare*, fr. L *in-* + *humus* earth — more at HUMB : BURY, INTER — **in·hu·ma·tion** \ˌin-hyü-'mā-shən\ *n*

in·im·i·cal \i-'ni-mi-kəl\ *adj* [LL *inimicalis*, fr. L *inimicus* more at ENEMY] (1575) **1** : being adverse often by reason or malevolence **2 a** : having the disposition of an enemy : **b** : reflecting or indicating hostility : UNFRIENDLY — **in·im·i·ca** k(ə-)lē\ *adv*

in·im·i·ta·ble \(ˌ)i-'ni-mə-tə-bəl\ *adj* [ME, fr. MF or L; MF, *tabilis*, fr. *in-* + *imitabilis* imitable] (15c) : not capable of bein : MATCHLESS — **in·im·i·ta·ble·ness** *n* — **in·im·i·ta·bly** \-blē

in·i·on \'i-nē-ˌän, -ən\ *n* [NL, fr. Gk, back of the head, dim. of ew, tendon] (ca. 1811) : the external occipital protuberance o

in·iq·ui·tous \i-'ni-kwə-təs\ *adj* (1726) : characterized by ini see VICIOUS — **in·iq·ui·tous·ly** *adv* — **in·iq·ui·tous·ness** *n*

in·iq·ui·ty \-kwə-tē\ *n, pl* **-ties** [ME *iniquite*, fr. MF *iniq iniquitat-*, *iniquitas*, fr. *iniquus* uneven, fr. *in-* + *aequus* equa : gross injustice : WICKEDNESS **2** : a wicked act or thing :

[1]**ini·tial** \i-'ni-shəl\ *adj* [MF & L; MF, fr. L *initialis*, fr. *initi* ning, fr. *inire* to go into, fr. *in-* + *ire* to go — more at ISSUE] : of or relating to the beginning : INCIPIENT **2** : placed at ning : FIRST — **ini·tial·ly** \i-'ni-sh(ə-)lē\ *adv* — **ini·tial·ness** nəs\ *n*

[2]**initial** *n* (1627) **1 a** : the first letter of a name **b** *pl* : the fir each word in a full name ⟨found that their ~s were identic large letter beginning a text or a division or paragraph **3** : PRECURSOR; *specif* : a meristematic cell

[3]**initial** *vt* **ini·tialed** *or* **ini·tialled; ini·tial·ing** *or* **ini·tial·l** sh(ə-)liŋ\ (ca. 1864) **1** : to affix an initial to **2** : to authentic preliminary approval to by affixing the initials of an authoriz sentative

ini·tial·ism \i-'ni-shə-ˌli-zəm\ *n* (1899) : an acronym formed fr letters

ini·tial·ize \-ˌlīz\ *vt* **-ized; -iz·ing** (1957) : to set (as a compute counter) to a starting position, value, or configuration — **ini tion** \i-ˌni-sh(ə-)lə-'zā-shən\ *n*

initial rhyme *n* (1838) : ALLITERATION

initial side *n* (1957) : a stationary straight line that contai about which another straight line is rotated to form an angl pare TERMINAL SIDE

[1]**ini·ti·ate** \i-'ni-shē-ˌāt\ *vt* **-at·ed; -at·ing** [LL *initiatus*, pp. of *i* L, to induct, fr. *initium*] (ca. 1573) **1** : to cause or facilitate ning of : set going ⟨~ a program of reform⟩ ⟨enzymes that ~ ration⟩ **2** : to induct into membership by or as if by speci : to instruct in the rudiments or principles of something : IN *syn* see BEGIN — **ini·ti·a·tor** \-ˌā-tər\ *n*

[2]**ini·tiate** \i-'ni-sh(ē-)ət\ *adj* (1605) **1** *obs* : relating to an ini : initiated or properly admitted (as to membership or an offic structed in some secret knowledge

[3]**ini·tiate** \i-'ni-sh(ē-)ət\ *n* (1811) **1** : a person who is undergo undergone an initiation **2** : a person who is instructed or some special field

ini·ti·a·tion \i-ˌni-shē-'ā-shən\ *n* (1583) **1 a** : the act or an in initiating **b** : the process of being initiated **c** : the rites, ce ordeals, or instructions with which one is made a member of society or is invested with a particular function or status **2** : tion of being initiated into some experience or sphere o : KNOWLEDGEABLENESS

[1]**ini·tia·tive** \i-'ni-shə-tiv *also* -shē-ə-tiv\ *adj* (1795) : of or relati tiation : INTRODUCTORY, PRELIMINARY

[2]**initiative** *n* (1793) **1** : an introductory step ⟨took the ~ in s to settle the issue⟩ **2** : energy or aptitude displayed in initiat tion : ENTERPRISE ⟨showed great ~⟩ **3 a** : the right to initia tive action **b** : a procedure enabling a specified number of petition to propose a law and secure its submission to the ele to the legislature for approval — compare REFERENDUM 1 — own initiative : at one's own discretion : independently of o fluence or control

ini·tia·to·ry \i-'ni-sh(ē-)ə-ˌtōr-ē, -ˌtȯr-\ *adj* (ca. 1615) **1** : cons beginning **2** : tending or serving to initiate

in·ject \in-'jekt\ *vt* [L *injectus*, pp. of *inicere*, fr. *in-* + *jacere* to more at JET] (1601) **1 a** : to introduce into something force fuel into an engine⟩ **b** : to force a fluid into (as for medical **2** : to introduce as an element or factor in or into some sit subject ⟨condemning any attempt to ~ religious bigotry into paign —*Current Biog.*⟩ — **in·ject·able** \-'jek-tə-bəl\ *adj or n* — tor \-'jek-tər\ *n*

in·jec·tant \-'jek-tənt\ *n* (1950) : a substance that is injected in thing